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The Situation in American Engineering and Scientific Education[1]

By REAR ADMIRAL H. G. RICKOVER, USN
U. S. Atomic Energy Commission

THE INDUSTRIAL, and hence the political, power of nations is dependent in large part on their scientific and engineering professions, and these in turn depend on a continuous inflow of capable and well-trained individuals. Indeed, a nation progresses or falls back in the race for survival to the degree that it succeeds or fails to afford each individual citizen the maximum opportunity for education and training.

An essential function of leadership, in the government of nations as in the management of industries, is to plan for the future. Perhaps the most insidious weakness a nation can have is the belief, fostered by propaganda of one kind or another, that it can do everything better than others. We in the United States are subjected to this kind of propaganda in various media, such as the slick advertisements of magazines. We overlook what we do not hear much about, especially if it is unpleasant.

One of the unpleasant facts which has but recently been mentioned is that, in the field of scientific and engineering education, our main competitor, Russia, is speedily passing us. According to the best estimates, the United States now has about 800,000 engineers and scientists; Russia, 650,000. Disturbing as this is, it is insignificant as against the rate with which she is increasing her engineering and scientific talent compared with us. In 1954, she graduated more than 50,000 engineers and scientists; the U. S., 23,000. Allen Dulles, director of our Central Intelligence Agency, has stated that between 1950 and 1960 Soviet Russia will have graduated 1,200,000 scientists and engineers, compared with 900,000 in the United States in our present program. Thus, by 1960, it is estimated she will have more engineers and scientists than we; moreover, the rate of attrition in Russia is lower than ours because of lower age.

Some may argue that Russian engineers are not technically as well trained as ours. This is not the case. It is true that they are trained in engineering exclusively, at the cost of their general education, and that their training is confined to narrow specializations. This is so because the Soviet educational philosophy is to train the individual for the particular purpose the state requires.

Russia educates as many women as men, and women constitute half of the total in the professions. In contrast, in the U. S. this is but a fraction of one per cent.

While our mass production system will permit us to build more things faster than Russia, their engineers, by their very numbers, may soon invent better machines. In rate of progress they are, in fact, already ahead of us. We must not take for granted our present technological leadership.

Some believe that the U. S. is not even graduating enough trained people merely to sustain our present rate of technical expansion beyond the year 1970. Unless the number of our scientists and engineers increases at an accelerated rate, our economy will be in serious trouble for lack of technological nourishment, because our pool of graduate engineers is the source from which arise nearly all our technological advances from jet engines and nylon to earth satellites, atomic power, and intercontinental missiles.

Accordingly, the present Soviet peace offensive makes a great deal of sense to the Russians. Recently, Khrushchev said: "We don't have to fight. Let us have peaceful competition and we will show you where the truth lies. . . . Victory is ours."

America's present educational crisis also involves quality, since we cannot match Russia's manpower in numbers.

Our primary and secondary schools have recently come in for much criticism. Actually, the average high-school graduate of today is better trained than the one of years ago, since today's school year is twice as long as that of 1870, the proportion of teachers to pupils is greater, and,

[1] Based on an address to the Thomas Alva Edison Foundation, East Orange, N. J., Nov. 22, 1955.

even with the changed value of the dollar, we spend nine times as much per pupil today as we did in 1870. Thus, the child goes to school twice as long, costs nine times as much to educate, but gets only a little better education than 85 years ago.

The real issue is not whether the present-day pupil compares favorably with the pupil of 1870, but whether he is adequately trained for the demands of today's society. I submit that he is not, on the basis of study, intuition, and the experience gained from interviewing more than 1,000 college graduates over the past 10 years. I discovered that all but a small number of the young graduates lack proper motivation. Some of them consider their degree merely as a ticket to a job, a pass for security. They use the college as a "service station." This desire for security in terms of money, rather than in opportunity for self-improvement, is hard to understand in a society where security is so readily available.

SCHOOL AND SOCIETY

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Education's International Journal

Further, they know many facts—but they have not learned many principles. A good engineering course is one in which the student learns the principles of mathematics, physics, mechanics, electricity, metallurgy, and chemistry. A thorough understanding of these leads easily to handling the facts associated with them.

I do not believe that "practical stuff" should be or can be properly taught in a university. Nearly all college textbooks are several years behind current industrial practice. Furthermore, they are written by men who do not have the latest "practical" information, so that the texts are obsolete even while they are being written. The employer who wants a "practical" engineering graduate is simply hiring a man who knows how to make the same mistakes that have been made in his plant for the past 10 to 15 years.

The failure in education is not the fault of the educators alone. It is the fault of all of us in not recognizing the impact of the 20th-century scientific revolution and taking the necessary measures in time.

This is my view of some of the problems that face us in engineering education. What can we do about them?

All who are qualified should obtain a college education. Today, 60% of the best students graduating from high school do not go to college. This is a tremendous loss of talent amounting to 250,000 students each year. And nearly half of those who do start college do not graduate. For every high-school graduate who eventually earns a doctoral degree there are 25 others who have the intellectual ability to achieve that degree but do not. We simply cannot afford a waste such as this.

We must increase the funds for education. The United States is spending about 2½% of the national income on education. In contrast, we spend more than four per cent on recreation. We spend more money for comic books than for all textbooks used in our elementary and high schools. In 1951 the amount spent for advertising was $199 for every family in the United States, but the amount for primary and secondary education was $152 per household. Our national outlay for the education of citizens was substantially less than our expenditures for the education of consumers.

Recently, our home permanent wave industry budgeted for research into ways of improving the looks of human hair about two cents per

female. The whole nation meanwhile was spending only three cents per capita for research into the distressing things that go on inside the human head.

We seem to be more concerned with expenditures for school buildings than for spending money to obtain better teachers. Schools can be constructed in two years or less, but it takes four years to train an elementary or high-school teacher and seven to eight years to train a college professor. Our school buildings may be the best in the world, but can we say the same of our teachers? Perhaps our children would be better off with fewer buildings, but with the best teachers it is possible to obtain. We plan to spend $25,000,000,000 in the next 10 years on school buildings. What amount are we prepared to spend for assuring better teachers for these schools?

An immediate step in solving our educational problem is to increase salaries drastically. Unless we quickly remedy the present treatment of our teaching and scholarly resources, we will inevitably have morally and intellectually incompetent teaching staffs. Eventually, the bright young man will sacrifice his desire to teach in favor of an adequate standard of salary, comfort, decency, and security for his family.

We all know of the nation-wide shortage of elementary and high school teachers. What is not evident is the real meaning of this shortage, since very few classrooms are ever closed because a teacher is lost. What happens is that teaching standards are lowered or the class size is raised. Both of these accommodations are already taking place at a growing rate. When a teacher with the desired qualifications is not available, someone with lesser qualifications is hired.

The great increase in our productive capacity comes from the optimum use of people and facilities. Some of the problems of education, particularly those concerned with administration, are susceptible of solution by the same methods we use in industry. Industry cannot operate effectively in a 180-day year. Why should we think our schools can?

Increasing the length of the school year, say to 210 days, would be the equivalent of making two additional years available before college. If to these two years we added better teaching, better school administration, and better use of school facilities, it is quite possible for a young man of 18 to have completed the equivalent of the present-day college course. This is not as far-fetched as it may sound. Something close to this has been achieved in Europe.

It may be impossible for us to compete with Russia in the number of trained people, but we must excel in the quality of our trained people. This requires a drastic change in our attitude towards our primary and secondary schools, particularly the latter.

The high school no longer aims chiefly to prepare students for college; it now provides educational, occupational, civic, and cultural training for every child. Under pressure from various groups, courses are being given whose educational value is questionable. Nearly half of our high schools offer little or no instruction in physics, chemistry, or in mathematics beyond introductory algebra. The percentage of high-school pupils today who study scientific subjects is indicative of this: physics—23% (1900), 4% (1950); chemistry—10% (1900), 7% (1950); algebra—52% (1900), 27% (1950); and geometry —27% (1900) and 13% (1950).

The high schools have been required to take care of the average boy or girl. For many children the school makes up for what they cannot obtain at home; and, in some cases, it takes the place of the home. The ones who suffer are the gifted children.

A partial solution to the high-school problem is to set up two kinds of schools, one having higher standards than the other. There can be no valid objection to this, because boys and girls with the necessary ability could go to the more difficult school. True democracy does not require of us that we hold back the qualified; it does require that we give each individual the opportunity to develop his talents to the fullest.

There is, however, a current of educational thought which is opposed to special treatment of gifted children. It is claimed that there are too many difficulties and injustices involved in recognizing ability at an early age, so that children of all abilities must be educated in a common manner. It is also claimed that educational grouping of this sort leads to or accentuates social stratification and is, therefore, undemocratic. However, if it is democratic to give special care to our retarded children, it is democratic to help our brightest children.

With reference to the serious shortage of qualified teachers, a partial solution, and one which could be immediately effective, is to enlist the

aid of industry. Why cannot the scientists and the engineers from industry be given sabbatical leaves to teach in our schools? The very shortage of college graduates and many of our educational problems have been created by the vastly increased requirements of industry. In 1900, the ratio of engineers to other workers was one in 300; today it is one in 60—and in highly advanced industries it has already reached the figure of one for about every 20 workers.

Industry is today short more than 40,000 engineers and will require a minimum input of 30,000 for many years to come. The only serious attempt made by industry to solve this problem has been to offer considerably higher salaries to young college graduates. This has resulted in an unhealthy situation where the small number of graduates are being sought after by many organizations. Recently, at one college, the same 200 members of the graduating class were interviewed by representatives of nearly 500 companies. This is not recruitment; it is inflation. We have learned in the case of goods that inflation can only be solved by greater production; this is true of college graduates as well. There is danger to the young graduate in being sought after so avidly. Success is too easily achieved, and he gains it so quickly and so easily that he has had no time to learn the humility to handle success, or even to realize that he will need humility.

We should expect industry to help carry this social obligation. In present-day America the business corporation is not a business device alone: it has become a social institution and has acquired the obligations inherent in this concept.

We always have recognized a duality in our schools: Federal and local support; public and private support. Industrial support of schools fits into this duality. It also has been characteristic of our people that, when a social need arose which government was not able to take care of, groups of citizens have joined together to help.

At their own expense, industrial organizations should make available their scientists and engineers for one-year periods to teach in our high schools, colleges, and universities. The cost will be more than repaid by the larger number and better-trained students who will soon be available.

Industry can also help in providing scholarships and other aid. I suggest that financial contributions to education rather than scholarships be made, but on a considerably larger scale than is presently the case, perhaps as a percentage of gross sales. These funds might be assigned for distribution to central groups of men not associated directly with industry or with the schools. This will eliminate any possibility of industry being accused of influencing education or the schools of being self-seeking. The use of manpower and funds by industry in this manner could be considered as a legitimate operating expense required for the future good of the business. Similar contributions by labor unions would also be appropriate. Such funds may be used for establishing, staffing, and operating new

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schools. Scientists and engineers of each community, as part of a definite company plan, could act as counselors for one or more high-school students, devoting a part of their time to helping them to become interested and proficient in scientific and engineering subjects. They could also take over the leadership of the various after-school clubs in science, radio, mathematics, etc., thus relieving the teachers of this duty.

The United States, if it is to succeed in its role of world leadership, must produce citizens who have the wisdom, the vision, and the knowledge to grapple successfully with world problems, citizens who can see critically through conventional values and who are able to subject to principle and to reason all claims to power.

It will matter little what other excellences our educational institutions possess if they neglect to recognize and to foster high ability wherever it is found. The task of ensuring that every youth in our land is helped to his highest intellectual growth is a formidable one. This task arises not alone from the military situation posed by Russia, but also from the realities of the rapidly spiralling scientific revolution. We are faced with a fateful challenge. The way we, today, meet it will determine the future of our country. We must not let it be said by future generations that we used our intellectual and moral capital without replacing it.

Some Trends and Issues in MEDICAL EDUCATION

By MAX S. MARSHALL

University of California Medical Center, San Francisco

A BRITISH ANATOMIST, David Sinclair, speaking from a British training and after visits to representative medical schools in this country, recently wrote a book called "Medical Students and Medical Sciences."[1] Presuming to no acquaintance beyond medical students, the author nevertheless provides a refreshing outlook on features of education in general. In this short paper, mere samples of issues, also appearing to be specific but linked with education at large, are all that can be presented. Three are chosen in the hope that something of the medical viewpoint can be gained from them.

First, a look at the three divisions of formal medical training may be enlightening: the premedical, preclinical, and clinical years. There are three more—internship, specialized training or residency, and practice—but these, coming after the degree, are beyond schoolmasters. Premedical training begins with kindergarten and lasts through the junior or senior year of college. Medicine touches only the last two or three years of this period. Preclinical training takes about two years in a medical school, with anatomy, physiology, and biochemistry to analyze the normal body, and pathology, microbiology, and pharmacology to stress abnormalities. The last two years before the degree are virtually all clinical.

In premedical training trends are perhaps undetectable but issues are not. For one thing, maturity is mandatory for medical training. Because of this, an excellent argument could be made that at least one late premedical year be spent not nearer than five miles to a campus. A detectable cry is also heard that solid foundations and cultural training are significant in medicine, as what is not? Less emphasis is needed on courses easy enough to get grades[2] and more emphasis can be used on the distinction between courses which strengthen the groundwork for medicine and those which merely dilute and spoil it later, at the cost of time which could be better used.

The influence of medical schools on premedical training is indirect. So long as there are sufficient applicants for medicine and so long as medical schools feel that this training is not their business, a feeling heartily reciprocated by most teachers dealing with premedical students, the influence of medicine will be indirect.

[1] Oxford University Press, 1955.

[2] A current trick is to enroll in courses given by men whose letters of recommendation are exceptional.

The most direct control is by means of prerequisites, often selfish and sometimes ridiculous, but always an easy route of escape for those who wish to gain hours or unload an unwanted subject and an easy way to force the hand of a preceding school. An indirect influence on premedical training arises from the intense emotional interest in medicine on the part of self-styled premedical students and their teachers. This leads to tactical maneuvers, Big Talk, and dangerously biased curricula. This menace is real and appreciable. The medical side appears to favor the building of a sound foundation, leaving medical subjects for directed and balanced approaches, for a better timing, and for training as close as possible to maturity and the deeper understanding and continued use which come in later years.

In premedical training there is another issue which cannot be forever ignored, though it may not yet have been seriously raised. Medical training is exceedingly long and the trend is toward even greater lengths, with internship-residencies lasting as long as five years or a bachelor's degree required for applicants. Although the ratio of applicants to accepted students has dropped appreciably since the war, probably applicants for medicine will continue in such numbers that selection of those with desired qualities will remain possible, for medicine will always have strong attractions. A greater interest in premedical training on the part of medical schools seems possible. Medicine minds its own business almost to a fault. However, costs, the lengthening period of training, and social pressures by taxpayers, students, and families may force medicine to a higher degree of educational efficiency rather than to the answer perhaps too often used—an extension of time. Since there is a sharp limit to what can be properly accomplished in terms of condensation within the medical school itself, the only direction to turn is toward the premedical years. This need not be as horrifying a thought as some may think. A trend toward a more solid basic and cultural training supports academic principles. Medicine might still use some of this time. Such training as is given in the first year could be absorbed, either as such or in fractions, at ages when absorption is at least as easy as later on. This transition is not a trend, but it might become an issue in a field which demands a vast amount of knowledge, obtainable at early ages, and an infinity of understanding, obtainable only with maturity.

The second sample of trends and issues is definitely a trend but is by no means a settled issue—"integration." A perfect educational structure might well be presented in two phases: truly basic training (mathematics, English, philosophy, physics, etc.) built as high as might be, with later professional or trade schools, the function of which was to integrate these basic trainings toward given goals. The basic courses are the vertical foundation posts reaching down to bed rock, but to some they are horizontal foundation blocks. Unfortunately, the use of "vertical" and "horizontal" has become hopelessly confused. The mental image of slices through vertical piles taken at different angles to make each profession will explain the relationship between basic training and the combinations which make up the trades and professions of pragmatic living. Vertical or horizontal, there are solid basic subjects in finite number and combinations of bits thereof in infinite number which make the professions and trades. Medicine is surely one of the most intricate combinations of all.

The destinies of medical schools are guided largely by medical men who naturally look upon their professional training as an entity, though it is really more of a comforting patchwork quilt, to try a simile which keeps the troublesome vertical dimension out. The current trend toward "integration" puts emphasis on sewing up the quilt rather than on the component squares, some of which may be rotten or ugly, or on the finished quilt, which can be smooth and effective or can be a jungle of unharmonized patterns. No orator is needed to give a resounding speech about how the anatomist talks of a muscle and the physiologist of its control while the physician presents the case with muscular dystrophy. A narrow educational concept is thus easily glorified.

The concept of integration is only partly due to the fact that medical men are results of integration. Medical students have been in school for what, to them, seems like a painfully long

time. They want to see patients and get into medicine in a hurry, which provides a tempting opportunity for rationalization. Older teachers will recognize, too, an ancient debate: all human activities are composed of many fragments of basic "subjects" so that everyone except the basic teachers themselves is ready to argue with the university man who tries to uphold a degree of purity, the fundamental viewpoints (and I do not mean theoretical viewpoints) of his field.

The fact remains that the tendency toward early "integration" is a weak bit of rationalization, a mere desire to change because education is and will remain imperfect, a wish to take in someone else's field, and a concession to an understandable but misplaced desire on the part of students. In one school the idea has been carried to the point of virtually abolishing the basic elements on which medicine is built, though the men and the subjects are not so easily eliminated. There is an easily detectable similarity between this and the teaching of reading without alphabet, languages, grammar, or orthography, though medical proponents do not see their paradoxical stand in this respect. Either process *can* meet with apparent success with adept students and teachers. The fact remains that Johnny better learn the alphabet and the garage mechanic better start with a little study of his tools instead of with a Cadillac. Our quilt of medical comfort certainly needs its stitching but the cloth must be solid and in harmony and the basic knowledge must come first. Some feeling for numbers is attainable by the accretions of experience, but the multiplication table, not always inspiring, is of definite help.

The issue of integration should not exist in medical education and not only because well established basic subjects are the squares from which medicine is built. Medicine itself is a rigorously applied combination of basic training with clinical training necessarily done at the bedside. This clinical training is the very essence of integration. If and when the clinicians of medical schools see this, and it seems inevitable that they should, they will protest against early integration just as they protest against other deficiencies in basic training. They will demand solid basic training on which they can perform their clinical integration without the frustrations arising from previous surveying, skimming, and loss of solid foundation. They may call a physiologist or a microbiologist to the clinic, but they will be properly unwilling to take time from the clinics to approach first- or second-year medical students who are, of course, all too easily flattered and impressed by them.

The thought of sound basic training in the elements which merge into the more worldly assemblies of different basic elements which compose trades or professions applies much farther than medicine. In medicine, however, the problem is specific because of the nature of medical training and because the long period of schooling leads to impatience. No doubt some better integration is possible, and probably the merging of basic and clinical outlooks at the right time can be done more smoothly. Integration, in a more extreme sense as is now commonly discussed and variously tried, is decidedly treacherous.

In any educational move a teacher must start with the student as he is, talent and experience considered, and go with him until he reaches another point of development.[3] It is legitimately possible for an anatomist, physiologist, or microbiologist to begin in September with the basic academic background and to end the course talking, in some degree, the clinical language of his field. This is radically different in educational viewpoint from bringing into the classroom a man in bed and talking about a sort of fascinating miscellany for which students are not prepared while someone says the man has kidney disease, all to point up what could be otherwise a solid basic talk on the kidney.

The integrationists deserve no credit for the discovery that many things are related; rather, the educators of some centuries back deserve credit for analyzing situations and discovering basic components. Ultimately, perhaps, medical educators will see that their plea for a solid structure on which to put the whole of medicine calls for a similar solidity within medicine to cement the basic training to the ultimate clinical integration.

Third, at some risk, an ingress into medical

[3] M. S. Marshall, *Journal of Dental Education*, 18:71-80, March, 1954.

issues can be gained by considering the tremendous financial difficulties not in terms of dollars and budgets so much as in terms of education and moral precepts. There are four segments of educational monetary concern: students, schools, research, and faculties.

Students at 22-26, more or less, are not infrequently getting married these days. Some figure with care, and the wife helps toward the education. Some do not care and acquire worries from devious angles. Unfortunately, a few expect society to pay the freight, apparently feeling that a society that makes them go to school all their lives must take the consequences. The principal sources of income, seldom more than two at once, are families, wives, personal earnings, scholarships, loans, and subsidies. The great dispute arises over subsidy. Should there be any and, if so, should it be private or governmental? In an emotional moment mention of royal subsidy gets much applause, with an image held up of the poor struggling medical student giving his all to the service of mankind. There is some truth there but little analysis. These students are asking to become among our highest paid men and women, though certainly not without working for it. They also command a high prestige from society. If they lack talent and/or are not willing to work for these things, they should not be allowed to continue. On the other hand, it is not easy for a family to pay for a medical education as well as support, perhaps, the son's family, this after having already furnished support for a quarter-century. Also, a medical student has many demands that must be met in terms of efficient education, demands that preclude any great earning capacity.

The best harmony is derived through the five sources of income other than subsidy, but there is no doubt that plenty of tight spots arise in every medical school. A student who was all set financially loses his father, or the family encounters a long illness. The most common trouble is pregnancy, when the student was counting on his wife's earnings. So was she. Government subsidy, which to some looks good, is not a tenable answer, at least without sharp restriction. It would change the whole character of the medical student group, since a freeway to prestige and wealth would be offered instead of a difficult way. Medical men themselves are trying to provide aid for deserving tough situations. With good referees, preventing too much aid for self-pity, the sources of monies for exceptional subsidy cease to be the issue. We have a generation in which some students will blithely seek aid to pay for new cars and refrigerators. I have even seen requests for free monies so that a student's wife could finish her education! Let us hope that medicine can take care of its own on a sane, discriminatory basis which preserves but does not enervate.

The financing of medical *schools* is a part of this educational discussion only with respect to *research*. The tremendous emotional impact of medicine, heavy with subjective overlay, produces money in countless ways, the impact of which on education is undeniable. Once only a president might accept monies and he might reject that which seemed inappropriate in a university. Now the finding of monies for research and the use thereof to gain prestige or fame are so common that the basic structure of universities is endangered. This is fully apparent in medicine, where it is particularly disturbing to turn loose the thought that the answers to questions are on sale, with harder questions calling for more money and heavier subsidies buying faster answers. Furthermore, the heavy inflow of cash fosters the "institute plan," the development of departments within departments. I know of no one who would argue that there should never be such, but the principle is ticklish, indeed. A department which has funds or power will hire its own specialists without regard to those responsible for the specialty; or, committee amalgams are formed which essentially set up powerful groups within and at cross purposes with departments, functions, and ideals of the school. Institutes are formed at the expense of basic units sometimes to such an extent that the basic units are lost, when the cycle starts again. This is genuine disintegration. At the roots of these trends are monies.

In a medical *faculty* itself gold is not a special educational item, save in one respect. Nonmedical professors in medical schools, few in number, are like others elsewhere. Medical professors either subscribe to similar conditions or, more often, have outside sources of income. A surprising amount of time is devoted, some of it most substantial in both quality and quantity,

by men whose incomes from the schools are as low as zero. On the other hand, those who presumably carry the same responsibilities as nonmedical teachers, with the same income, may also have outside practices. These men are forever rousing the green glances of envy, often accompanied by sarcasm. In terms of envy, this is merely small, for the backbone of medicine is the man who practices medicine; devotion to a school, though it sometimes enhances prestige, usually means notable financial loss. In terms of education it raises a question, perhaps never to be settled, of the "full-time teacher" in medicine. The debate is old. The good answer must always be specific for men and schools. Empirical schemes, such as consolidation of earnings to make everyone theoretically on full time, or the insistence on marked sacrifices by men who wish to pursue some academic life in medicine by no means provide answers.

Educationally, the sane answer would seem to be that unsensational but unbeatable one: the best possible balance. This means a mixture of full-time men and nearly full-time practitioners, with others in between, in no stipulated proportion but dependent on departmental balances and on the men themselves. There will always be a few who abuse privileges; however, in medicine the occasional chiseler is usually more knowledgeable and more industrious than the academic chiseler, also not too common a species, who rides an easy path to his salary.

There are other trends and issues, significant and worth discussion, but perhaps an outline which has a few open doors in it has been suggested. Three have been offered: the status of premedical training, the almost ballyhooed trend toward "integration," and the issues of finances, with specific problems in medicine. Experience has been added to the issues discussed without apology but also without, I hope, attempts at coercion.

Clinical Pastoral Training: Experiment in THEOLOGICAL EDUCATION

By ORLO STRUNK, JR.

Institute of Pastoral Care, Inc.
Massachusetts General Hospital, Boston

RARELY DO discussions of issues in theological education find their way into the professional education journals. There are undoubtedly many reasons for this. Protestant theological education is fundamentally a highly specialized type of education, concerned primarily with the preparation of parish clergymen. This somewhat professional tone, quite akin to that of the education of doctors and lawyers, suggests a certain conservative atmosphere which may cause some professional educators to think of theological education as a rather static and dogmatic affair, hardly open to the free spirit of criticism so often found in contemporary education literature.

At the same time, the education of Protestant ministers has often received a bit of the same verbal lambasting accorded to higher education in general. This was especially true during the fury and storm of the first half of this century. In the early 1900's, for instance, G. Stanley Hall did not find it difficult to assert with composed confidence that theological schools "close questions rather than open them to the methods of progress. . . ."[1] That theological education still receives some healthy whippings may be attested to by a hurried reading of a relatively recent article written by Hugh Hartshorne.[2] Among other things, this distinguished Yale professor has accused theological education of being neither theological nor education.

So in reality theological education is not living as sheltered a life as one might conclude from reading the contemporary journals of edu-

[1] G. S. Hall, "Educational Problems" (New York: Appleton, 1911), p. 188.

[2] H. Hartshorne, *Religious Education*, Sept.-Oct., 1954, pp. 340-347.

cation. Indeed, there are some obvious indications that theological education has taken on a few rather new and imaginative experiments. The clinical training of clergymen might certainly be considered an imaginative adventure, and, in a real sense, it is still a relatively new experiment.

It is a rather interesting observation, if not an especially startling one, that the clinical pastoral training movement was not initiated by an educator as such. Though one would hesitate a long time before attempting to assign or name *the* original stimulus to clinical pastoral training, it is relatively safe to say that the medical profession furnished a significant influence. In 1925 the well-known Boston physician, Dr. Richard C. Cabot, then professor of clinical medicine at Harvard, sent forth a plea for the clinical training of ministers:

> When we urge a theological student to get "clinical experience" outside of his lecture rooms and his chapel, to visit the sick, the insane, the prisons and the almshouses, it is not because we want him to get away from his theology, but because we want him to practice his theology where it is most needed, i.e. in personal contact with individuals in trouble.[3]

Though it is not our purpose to consider the history of the clinical pastoral training movement, it should be noted that many "secular" events have influenced the formulations and evolution of this religious-psychological-educational movement. Certainly medical psychology has had a strong influence, as has the psychology of religion, especially as represented by James, Starbuck, Leuba, and many others. Freudianism, neo-Freudianism, and neo-neo-Freudianism placed their mallet blows on the clinical training of ministers. And surely liberal theology and the humanistic look shaped it a bit, too. But one of the most significant factors in the development of clinical pastoral training, at least from the point of view of education, has been the surging tide of experimentalism. In a very real sense, clinical pastoral training is a manifestation of Progressive education.

It is quite true that many of the pioneers of clinical pastoral training were ministers and doctors who usually did not see all the educational implications of such a movement. Undoubtedly not a few of them would have shuddered if their efforts had been interpreted as a manifestation of John Dewey's philosophy. Some, however, were quite cognizant of this fact. For example, Paul E. Johnson, one of the pioneers of the movement, stated, in an article written for Christian educators, that Progressive education is "learning by doing" and then went on to describe and laud clinical pastoral training, an obvious manifestation of such a theory.[4] Seen in this light, clinical pastoral training should be of keen interest to the secular educator, for it represents an experiment in experimentalism and in a field which might seem to some educators quite strange and esoteric.

Let us look briefly at the particular ways in which clinical pastoral training represents an attempt to apply Progressive views to theological education.

Clinical pastoral training bases its case on the assumption that we learn by doing. In clinical pastoral training the theological student is placed in a *clinical* situation, which means that he must deal with persons in a face-to-face relationship. This is brought about in several specific ways. He may serve for two weeks as an orderly in a general or mental hospital. This may include everything from emptying bedpans to taking blood pressure, but also coming in direct contact with patients, nurses, social workers, volunteers, and doctors. Later, when he is somewhat oriented to institutional procedures, he becomes an assistant chaplain and regains his ministerial role; but he is still functioning in a clinical situation. He spends much of his time counseling patients, bringing to them the resources of his particular profession. A minister is a man of crisis, and in an institutional setting the clergyman discovers exactly what this means. His theological and psychological theories take on a new dimension as they are tested "under fire"; and—always under close supervision—he is indeed learning by doing.

Clinical pastoral training, like experimentalism, attempts to cultivate individuality. Perhaps, more accurately, it attempts to create an atmosphere conducive to *personal* growth. It is interesting that, though historically this has not been the fundamental aim of the clinical pastoral training movement, students receiving clinical training almost invariably speak of personal growth as one of its greatest contributions.

[3] R. C. Cabot, "Adventures on the Borderland of Ethics" (New York: Harper, 1926), pp. 6-7.

[4] P. E. Johnson, *Christian Education*, 30: 103, 1947.

It is not surprising that a person grows when so many completely new experiences are presented to him. The observance of an autopsy, of shock treatment, of surgery all contribute to one's personality, one way or another. The integration and assimilation of these new experiences often take place in the seminar sessions, a vital and educationally significant part of clinical training.

The clinical pastoral training movement emphasizes the necessity of making the most of the opportunities of the present life. This is perhaps best illustrated by the general tendency to start where the patient is, in the same manner that the educator starts where he finds the student. The clergyman has been accused very often of a superficial optimism or a tragic pessimism, of avoiding reality. Certainly there have been many valid reasons for both accusations, but orientation to reality plays a tremendously important role in clinical training. It is necessary that the minister and the patient face reality together. Though therapy has a place in the chaplain-patient relationship, it is not an "everything-is-going-to-be-okay" approach. In general, the approach is that persons facing crises must make use of every resource available to them. To the religiously oriented, this means that to draw on *all* powers available to man is to make the most of every opportunity. Together the minister and the patient attempt to come to terms with real problems.

The influence of Rogerian methodology has had quite a strong influence in clinical pastoral training. And though few chaplain supervisors[5] are thoroughgoing Rogerians, the tendency to be "non-directive" is conspicuous. Other counseling techniques, especially suited to the unique role of the clergyman, have been formulated by pioneers in the movement and are used and studied with some care.

Closely associated with the above observation is the stress which clinical pastoral training places upon the emotional aspects of life. In the past, the criticism of experimentalism relative to the tendency to intellectualize all of life was especially obvious in the theological school. Though religion itself often has been viewed as an emotionally pregnant affair, theological education has been criticized just as often as an "ears up" affair, quite remote and quite blind to the real needs of persons. The clinical pastoral training movement is a sincere attempt to homogenize the intellectual and the emotional so that both might find their respective places in the development of the whole person. The emphases of psychoanalysis, psychiatry, and psychosomatic medicine have continuously stressed this needed consideration. Indeed, "empathy" is a favorite word amongst clinically trained ministers, and it is taken quite seriously. The patient is not a subject to be preached to, to be intellectualized to death, or argued into submission. The patient is to be wholly understood and completely loved.

Clinical pastoral training is student-centered rather than instructor-centered. There is a general tendency in clinical pastoral training to restrict the number of students assigned to each chaplain supervisor. For example, in programs sponsored by the Institute of Pastoral Care, one of the several training agencies furnishing ministers with clinical experiences, no more than six students are allowed to each instructor. This insistence upon small classes gives the movement an excellent opportunity to develop group discussion methods. Though lectures are not completely forsaken, the emphasis is definitely on the give-and-take of discussions groups. Diminutive classes also permit frequent interviews with the chaplain supervisors and lead to a group cohesiveness seldom found in the large classroom situation.

Several professional journals already have been founded which deal with the various phases and problems of pastoral psychology in general. We might ask, however, if the clinical pastoral training movement has any implications for higher education in general, and if, in some way, secular educators might contribute to the improvement of clinical pastoral training programs.

So far as the first question is concerned, we have seen at least five ways in which the clinical training of ministers might be interpreted as a manifestation of experimentalism. We should mention again that there were multiple factors which contributed to the initiation of clinical pastoral training; but Progressive education was certainly one of them. The modern educator, whether his interest be historical, critical, or

[5] Chaplain supervisor is the title usually given to the chaplain of the institution in which clinical training is offered. The academic and clinical training requirements of these instructors are quite rigid and not a few hold graduate degrees beyond their professional degrees.

practical, might seriously look at this movement, if only to evaluate it in the light of modern education. He might also find it rewarding to compare its results with the "more orthodox" methods of higher education.

Just what the so-called secular educator can contribute to clinical pastoral training is a moot question. One thing is quite obvious: there is a paucity of research in this field. Educators, especially those who are experts in educational research, could encourage and even instruct the clergy as to the importance of research in the development and evolution of any educational approach. To date, very little reputable research has been done in clinical pastoral training. Higher education researchers may find in the clinical pastoral training of American ministers data which they will consider well worth investigating.

THE TEACHER: A Skilled or Professional Worker

By BERNARD MEHL
The Ohio State University

THERE EXISTS TODAY the realization that the classroom teacher needs assistance in terms of salaries, teaching loads, and working conditions. There is also a move afoot to increase the status of teachers in the eyes of the general public.

Admittedly, teachers as professional workers need to be sold to the public, but the question remains, Are teachers thought of as being truly professional by those who hire them? If administrators and school board members act as though teachers are not really professional by treating teachers as professionally incompetent, then no amount of "selling" will enable the public to accept the notion of more status for a nonprofessional group.

The task now is to define the term "profession" and, since there are so many views which hinge on certain prescribed qualifications, the definition offered will be strictly operational. Simply, a person is to be deemed professional when he no longer needs supervision in carrying out his occupational duties.

The professional worker is trusted either to know how to handle most of the situations which may arise in his occupational domain or, at least, to use his judgment to admit of insufficient knowledge in certain cases. If the members of an occupational group are not granted this trust, then, whatever their task or whatever their training may be, they will not achieve professional status. Otherwise, no matter how many degrees a teacher has, no matter how important his job is for society, the individual teacher still remains a skilled worker and the mere use of the label, "profession," does not make him professional in the genuine sense of the term.

Considering the relationship between the teacher and his work, what elements are needed if professionalization is to be effected? This can be answered by looking at the relationships which hold between a master craftsman or established professional man and his peculiar task. This inquiry will be restricted to the way the craftsman, given his intensive training and knowledge, goes about his work.

That all workers are expected to handle certain routine chores is taken for granted; it is the degree of complexity of the routine operations which serves the function of separating the skilled from the non-skilled worker. The craftsman possesses skill beyond that of technical mastery over routine duties.

The additional function is the ability to utilize creative skill whenever a breakdown in the routine operations occurs or whenever a modification in the day-by-day operations of the job is called for. The craftsman is called upon to handle those cases which cannot be made to fit into an impersonal collective job enterprise.

Given this simple rule-of-thumb functional definition of the craftsman's function, it can be readily seen that the industrial world can be so divided into workers and craftsmen. This is so because the industrial operations can be more or less controlled and separated into those tasks requiring creative action and those tasks needing

skilled or unskilled routine functions. These sets of conditions probably hold for any large-scale operation, including the school. However, although the school follows the industrial pattern on administrative lines, it has not kept pace with industry in regard to the division of labor within the plant. The school has managed to install a system which denies to the teacher the chance to achieve craftsman or professional status.

Teaching can be divided into routine and creative tasks as follows:

Routine—policing the students, handling clerical details, collecting tickets, responsible for running off movies, grading papers, collecting material, etc.

Creative—selection of subject matter, method of presentation, knowledge of interest and desire of individual students, knowledge of social and individual goals, knowledge of changing techniques and emphases, construction of examinations, construction of unique teaching materials, evaluation of the teaching process, etc.

Since craftsman or professional status is achieved by a recognition of the creative, individual, and personal nature of the task performed, priority must be given to tasks which forego as much as possible the routine functions of the teaching day, if that status is to be effective.

Two practices reduce and hinder the eventual professionalism of classroom teachers. The first is the attempt to routinize the teaching process. There are numerous reasons why the standardization of teaching has been considered as a desirable aim. Certainly future years will see an extreme shortage of teachers on all levels of education. To fill the gap, less qualified personnel have to be secured. Therefore, when faced with insufficient numbers of professionally trained personnel, it is only natural that educators wish to adjust the situation accordingly. There is a parallel here between modern efforts to obtain teachers and the way teachers were hired when the common school movement took hold during the 1830's and 1840's. The rise of the normal school tempered this movement to adjust the teaching task according to the qualification of the poorly trained teachers, but the normal school was implicitly geared to teachers trained as semi-skilled rather than professional workers.

The use of teacher-training institutions connected with schools of higher learning should have wrought havoc with the conceptions which hovered over the normal school. Unfortunately, the hold of the old idea of classroom teaching also invaded the environs of the teachers' colleges. The teachers' college merely acknowledged the increased complexity of the teaching skill and proceeded to turn out skilled workers instead of the semi-skilled teacher of the normal school.

With the creative aspect of teaching being neglected, there arose a class of school workers equivalent to the foreman in the factory, the supervisor and special teacher, to exercise professional skill not possessed by the classroom teacher. Since the professional teacher, by definition, has no need for a foreman, the introduction of the supervisor carried with it the view that the teacher was nonprofessional. Efforts to supervise the teaching act somehow imply that teaching is something other than professional work, that teachers cannot be trusted professionally, and that teacher-training institutions have to limit themselves to the training of skilled workers.

The growth of the professional teacher is hindered by the amount of non-teaching tasks, from the collection of milk money to the arrangement of a trip to the zoo. These functions are at best adjuncts to the business of teaching. There are those who, in defense of these chores, say that anything the teacher does or is asked to do constitutes the teaching act. This fails to consider the priority status of certain acts in regard to other functions the teacher undertakes. The danger occurs when a choice has to be made between duties which are clerical and duties which are instructional; the teacher under pressure may be forced to choose the clerical. Such a choice would be truly detrimental to the making of a teaching profession.

To conclude, teachers are professional when they perform the creative and unique acts of teaching. If this is so, teacher-training institutions must reconstruct their programs so that their graduates are qualified to perform the creative teaching act. This may mean reconsidering the place of theory and the liberal arts in the teacher-training curriculum.

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COLLEGE PUBLIC RELATIONS: A Reappraisal

By CLAY SCHOENFELD
University of Wisconsin

COLLEGE PUBLIC RELATIONS is a phenomenon of the 20th century. Its introduction to the campus may be marked by the spate of news bureaus and extension divisions founded between 1900 and 1910. Their emergence was symptomatic of a gradual adjustment in the character of American higher education.

In this adjustment of the American university to the modern American environment, there have been six principal steps:

The flourishing of the land-grant college—a public proclamation that higher education in the United States was not alone for the well-to-do or for those going into the learned professions, but for the industrial and agricultural classes as well; the adoption of the elective system—opening the way for the proliferation of courses which in turn attracted unprecedented numbers of young people to college; the growth of graduate and professional schools—an emphasis on scholarly research which could be applied directly to the solution of public problems; the rise of the service university—programs of adult education, public service, and extension carrying the campus to the people; the development of academic administration as a discipline in itself—deans and directors bringing to the campus new efficiency and effectiveness; and a growing acceptance by these administrators of a public-relations point of view—the university as a community of citizens rather than a community of scholars.

These adjustments have created a new university, still scarcely aware of its powers, self-critical of its limitations, inspiring and inspired in the boundlessness of its dreams. The adjustments have been created by, and in turn have themselves created, a heightened campus consciousness of the university as a public institution, drawing from the body politic its spiritual orientations, its practical problems, and its physical wherewithal, and giving back to that body politic a tide of profound thought, a wellspring of skills, and a stream of young people carrying new life and enthusiasm to the citizenry of the country.

The perspectives and the procedures implicit in the adjustments we call *the public relations of higher education*—those policies and techniques designed to achieve a clear, candid, and continuous flow of insights and interpretations between the public university and the university publics.

This is the ecology of university public relations: a product of its environment, as the modern university recognizes the imperative importance of meriting and winning broad public support; contributing to its environment, as the modern university reaches out in organized fashion to grasp the hands of its constituents.

University public relations is now generally accepted as encompassing those policies and functions designed to achieve the interpretation of public needs and desires to an institution and the transmission of institutional ideas and aspirations to the public to bring the university and its publics into harmonious and fruitful adjustment. Implicit in this definition are three basic premises. Failure to understand and implement these premises is at the heart of whatever failures we continue to experience in university public relations today.

The first is: that public relations is primarily a matter of institutional conduct and only secondarily a matter of publicity. As such, it is inextricably linked with academic administration in all its aspects. Unless the basic policies and practices of a university are structured to merit public acceptance and support, it is totally unrealistic to expect publicity personnel to gain support for them. Public relations is deeds, not words. The reverse of this premise is, of course, equally true: that, in the absence of clear and continuous public information, good deeds cannot be expected automatically to attract public attention.

The second premise is that public relations is not the job of a single individual. Every contact between the university and its constituency is an episode in the complex flow of institutional relationships. Hence, sound public relations is a

way of life for an entire institution and cannot be delegated exclusively to a "director of public relations." The inference that public relations cannot therefore be directed is not sound. Just as a university's research program is guided by the dean of the graduate school, so a university's total public relations activities are most effective when they are planned and co-ordinated by an official so assigned.

The third is that public relations is a two-way street, involving both incoming consumer research and outgoing communications. A public-relations oriented university both talks and listens. It explains to the publics its traditional ideals and it detects from the publics their needs and wants. The university public relations man interprets to the public the standards and aspirations of higher education, and he interprets to the campus the opinions and aspirations of his publics. Out of this talking and listening—out of this responsibility and responsiveness—comes that balanced way of life which is the wonder and redemption of American higher education.

It is here, at the core of the public relations process, that we commit our most grievous errors in university public relations. On the one hand, there is the university administration so imbued with the necessity of winning public acceptance that it is willing to sell its academic birthright for a mess of enrollment or donation pottage. On the other hand, there is the university administration so bent on protecting academic prerogatives that it fouls those wells of public support which higher education desperately needs.

Of the two false paths, the former is probably the more commonly trod today. In our zeal to make friends and intrigue the public, we skim dangerously close, on occasion, to bartering away those great traditions of free thought and free inquiry which it is the responsibility of sound university public relations to foster.

How one such incident came perilously close to trammeling campus freedom country-wide, and how the situation was salvaged by men of courage and sound public relations perspectives, is one of the great untold stories of American higher education. In 1953, 14 colleges and universities answered with an unequivocal "No!" a Government demand that the Secretary of the Army have the final say on who should teach their correspondence study courses, despite the fact that public opinion was running strongly at the time in favor of all forms of "red hunting."

This case of the Defense Department vs. the universities is a revealing example of how fearful men can be placed in the position of whittling away at the premises and practices of the American tradition and of how that tradition can be successfully defended by men who do not equate university public relations with 100% blind surrender to public pressures.

Like most assaults on the fundamentals of democracy, the Department of Defense's attack on the integrity of American higher education had all the trappings of innocence. Since 1942, the Department of Defense, through its United States Armed Forces Institute, has been entering into a co-operative arrangement with some 45 colleges and universities whereby men and women in the Armed Forces take correspondence study courses from these colleges and universities at Government expense. The plan is simple. In effect, the Government merely provides a partial scholarship for the soldier, sailor, or airman who voluntarily enrolls in a regular credit or non-credit college correspondence course, taught by a regular member of the faculty of the institution concerned.

This arrangement has been covered by a contract between the college or university and the U. S. Armed Forces Institute. In the past, such a contract had provided substantially for nothing more than the exchange of funds from the Government to the institution for educational services rendered. In June, 1953, however, the Department of Defense submitted to the co-operating colleges a Fiscal Year 1954 contract which proposed the screening and the right of disapproving all professors involved.

On the surface, the Defense Department's demand looked well-meaning and harmless enough. Steeped in a sense of responsibility for loyalty and conformity in the military establishment, the generals and their aides were merely proposing that trustees, presidents, and deans delegate to Washington the job of policing 45 faculties. Who could say this was not in the best interests of the nation in those critical cold-war times?

To 28 colleges and universities, most of them minor, the Defense Department proposal seemed unavoidable in the light of "public relations." They signed their contracts. (Some later com-

plained that they had not read the fine print.)

To 14 institutions,[1] however, "Clause 1 d" was a firebell in the night. They saw in it a direct threat to the cherished American freedoms: the privilege of a college or university to be the sole determinor in the selection and retention of faculty, and the privilege of every individual, business, or agency to do business with the Government without fear of intimidation. They did not see "public relations" dictating that they sign their contracts. They not only sent back their contracts unsigned; they stated their position in no uncertain terms.

Here was a clear example of 14 universities recognizing that sound public relations involves responsibility for great academic traditions quite as much as responsiveness to public demands. Their stand not only drew compliments from the press; it won an about-face from the Department of Defense. Today the Cooperating Institutions Contract contains no Clause 1 d. Had it not been for 14 institutions of probity and courage, however, 45 institutions would be spiritually in hock to Washington today.

How do we preserve and strengthen a balanced public relations philosophy on our campuses? By making public relations functions and public relations personnel so much a part of the university structure that these functions and personnel reflect academic traditions quite as much as public opinions.

In the literature of public relations there is frequently encountered the principle that the chief public relations man in any enterprise must be a top executive, if the public relations function is to be carried forward effectively in that enterprise. The reasoning commonly is that in no other way can the needs and wants of the institution's publics be reflected adequately in institutional policy. It is equally important, however, that the public relations man be numbered among the top executives so that the standards and aspirations of the institution be sharply reflected in public relations practices.

If the university's public relations man—by whatever name he is called—sits with "top management," he is in a position faithfully to interpret the university to its publics and the publics to the institution. If he sits in the outfield, his incoming communications may be muted and his outgoing communications warped.

The policies of a university should be formulated with a view to its public relations, yes; but its public relations should also be formulated with a view to basic institutional policies. As public relations principles and the university ethos enter into a mutual adjustment, and as university public relations men become intimate and forceful members of the faculties that it is their privilege and responsibility to counsel, we can expect to achieve new horizons in American education for American society.

[1] The Universities of California, Georgia, Illinois, Kansas, Louisiana State, Michigan, Minnesota, Nebraska, New Mexico, North Carolina, Wisconsin, and Wyoming; Western Kentucky State College, and the Oregon State System of Education.

EVENTS

The Essentials in Teacher Education

MANY HAVE BEMOANED the scarcity of teachers today. A smaller number has added the qualifying *good* whenever the subject of the need of teachers arises. Those who think in terms of the good teacher do not always specify the characteristics which distinguish the good from the average or the mediocre. There are differing conceptions of the traits, attitudes, training, and experience to be possessed by a teacher before he is to be considered good. Since numbers seem to be getting much emphasis in current discussions of the teacher problem, it might be fitting to present a brief outline of one viewpoint on the type of background necessary for the real teacher.

In the proper sense of the term, a teacher is a many-faceted person—a well-informed, conscientious citizen; a well-educated individual, scholar if you will; a competent technician in the classroom; and a helpful, inspiring guide to his pupils. To achieve such a status, one must possess a variety of gifts. Let us consider thoroughness in scholarship and professional skill.

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No distinction should be made between those who will teach in the elementary schools and those who will teach in secondary schools.

Professional courses should be concerned with the essentials—educational psychology, philosophy of education, history of education, comparative education, and educational sociology. In addition to these foundational fields, the future teacher should have a course in the general principles of method and one in applications of these principles to a specific field. Supervised student teaching will give the new teacher an opportunity to put theory into practice. The allocation of time is something that must be worked out by representatives of all phases of the teacher education program. The major in education, which is now possible even in some liberal-arts colleges, results in an unbalanced preparation.

The graduate student who is already teaching or who is engaged in administration should pursue advanced subject matter and foundational work. Schools of education may also help him increase his effectiveness by providing good courses in the principles of administration, educational law, and controversial educational issues. He must be given an opportunity to do scholarly research, rather than humdrum and routine "studies."

Teachers, according to this viewpoint, will have a common meeting ground with all types of educated individuals and with each other in the profession. This concentration on the essentials in preparation for teaching will discourage the multiplication and duplication of education courses and will remove some of the friction between the inhabitants of both sides of the academic street. Thorough scholarship and a high grade of technical skill (in the broad sense of this term) will doubtless be instrumental in gaining for teaching the status of a profession with all its perquisites.—W.W.B.

GIFTED AMERICAN YOUTH PREFER THE PROFESSIONAL CAREERS

WHAT PLANS are America's best young brains making now for their futures? According to figures released March 5, 1956, by the National Merit Scholarship Corporation, a very high percentage of them are aiming for careers where they are needed most—in science and engineering.

The NMSC, which has been conducting a nation-wide hunt for the most able high-school seniors, assembled the figures from among the 5,078 semi-finalists in the search. The boys and girls involved come from every state. Results show that 56% of the boys and 16% of the girls among these highly talented youngsters desire to become engineers or scientists. Chemistry, physics, and various engineering fields hold the strongest appeal for this group.

The semi-finalists represent the pick of an original preselected 60,000 high-school seniors who took the first NMSC test on October 26, 1955. The original group represented students picked by high-school principals throughout the nation as those among the top five per cent of their senior classes.

In addition to the 45% over-all of gifted youngsters indicating an interest in science or engineering, 36% of the girls plan to become teachers and about 10% of both boys and girls would like to follow careers in medicine or other health fields. The next biggest category, where eight per cent of both boys and girls show an interest, is business. Law attracts eight per cent of the boys but only five per cent of the girls. Of the girls, 12% want a career in arts or letters, but only four per cent of the boys have this interest. Three per cent of the boys and four per cent of the girls want to specialize in either religious or social service careers.

Two per cent of these gifted young people do not fall into any of the above categories. Their interests range from diamond cutter, interpreter, or poultry and stock manager to careers as regular officers in the armed forces. One boy confidently stated that he would like to be a general.

The National Merit Scholarship Corporation was established in the fall of 1955 by grants totaling $20,500,000 from two leading foundations. Since then the NMSC has been conducting a nation-wide hunt for the high-school seniors best able to benefit from a college education. The purpose of the National Merit Scholarship program is to assist as many as possible of these top-notch young people through a college education. Originally, $1,000,000 was allocated to make scholarships available this year. But, with the help of a number of leading American corporations now participating in the program, more than $3,000,000 in scholarship money will be awarded in the spring of 1956.

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ACCELERATION IN TRAINING SCIENTISTS AND ENGINEERS

AN EDUCATIONAL EXPERIMENT at Rensselaer Polytechnic Institute (Troy, N. Y.), reported March 17, 1956, indicates that colleges of science and engineering could successfully advance some students to graduate studies without benefit of the senior year. This was the result of a six-week experimental program conducted at the college last summer by Arthur A. Burr, professor and head of the department of metallurgical engineering.

Ten students, who had just completed their junior year and who had been carefully screened for promise of brilliant achievement, were selected from 10 colleges and universities to participate in the experiment. Their previous experience had been in the field of physics, chemistry, and metallurgical engineering.

In the six weeks at R.P.I. they were "required to reach a level normally considered only within the capabilities of graduate students," according to Dr. Burr. "There is no doubt among us who administered the experiment that approximately half of the group could easily undertake studies toward advanced degrees without further undergraduate training," he declared. "The performance of all but one would have merited six credit hours of graduate work." He also believed that probably five to 10% of the nation's engineering juniors would be able to absorb graduate work successfully without senior-year training, if given the opportunity.

Further,

> If we could turn out that many engineers with advanced degrees in a year's less time, it would mean a great deal in today's shortage. A study of the group clearly indicates that serious consideration should be given in the future to the possibility of segregating the topmost students in science and engineering in order that they may take advantage of their exceptional talent to become productive sooner, as well as to be stimulated to higher levels of activity.

The two courses given dealt with the chemistry and physics of metals, extremely important fields in relation to new severity of requirements demanded of metals in their uses, for example, in atomic energy developments, jet engines, and guided missiles. The students were in contact with 26 different lecturers, all active research workers and all authors of scientific literature.

The students came from R.P.I., Siena College, DePaul University, University of Cincinnati, Oberlin College, Michigan State, Boston College, DePauw University, Illinois Institute of Technology, and Montana School of Mines.

Dr. Burr said plans are under way to repeat the experiment next summer. Each participant will be given a full-tuition scholarship and travel and living expenses as well.

NURSING EDUCATION IN JUNIOR-COMMUNITY COLLEGES

THE GROWING TREND of establishing nursing programs in junior and community colleges—to enable students to become registered nurses in two years instead of the usual three—was discussed at a conference, March 5-6, at Teachers College, Columbia University. The meeting was sponsored by the American Association of Junior Colleges, the National League for Nursing, and the Cooperative Research Project in Junior and Community College Education for Nursing of Teachers College.

About 165 persons, representing 36 states and Alaska, Canada, and Puerto Rico, attended. They included junior college presidents, executive secretaries of state boards of nursing, presidents of state leagues for nursing, hospital administrators, nursing directors in junior colleges, and government officials. Anna Fillmore, general director of the National League for Nursing, was the chairman.

Among the speakers were Hugo V. Fullerman, director of hospital services, United Hospital Fund of New York; Lucile Petry Leone, chief nurse officer, U. S. Public Health Service; Mildred Montag, director, Cooperative Research Project at Teachers College; Edward Miner, president, Orange Community College (Middletown, N. Y.); Dwight E. Barnett, professor of administrative medicine, Columbia University School of Public Health and Administrative Medicine; and Ruth B. Freeman, president, National League for Nursing, who discussed the league's views on junior-community college nursing education.

Recent Publications

BROWN, ROBERT E., *Middle-Class Democracy and the Revolution in Massachusetts, 1691-1780*, pp. 458, $6.00; LANNING, JOHN T., *The University in the Kingdom of Guatemala*, pp. 331, $5.75. Cornell University Press, Ithaca, N. Y.

CONANT, JAMES B., *The Citadel of Learning*, pp. 79, 1956, $2.00; PIERSON, GEORGE W., *Yale: The University College, 1921-1937*, pp. 740, $6.00. Yale University Ithaca, N. Y. Both 1955 editions.

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By AURA EDWARD SEVERINGHAUS, HARRY J. CARMAN, Columbia University and WILLIAM E. CADBURY, Jr. Haverford College. 400 pages, $4.50

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